

## Machine Control

A full portfolio for agricultural equipment manufacturers, offering navigation and implement control solutions for precision agriculture.

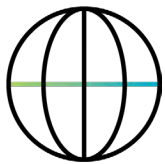


# Building Powerful Partnerships

We offer a diverse range of **reliable and high-performance** products for **machine control** in the field, **ensuring efficiency and accuracy**. Our solutions are designed to integrate seamlessly with a wide variety of agricultural equipment, enhancing operational effectiveness and process optimisation.

With **modular and customisable** products, we address the specific needs of each client. Additionally, we provide essential **precision agriculture** technologies, such as **navigation, implement control, and displays**, with specialised products for key field activities including planting, fertilisation, and spraying.

## What sets Hexagon apart in the market:



Global and impartial



Flexible and adaptive



Continuous innovation



Built for agriculture





# Why choose Hexagon as your partner for your navigation and machine control needs?

- Our products are **continuously evolving**, receiving ongoing enhancements and delivering ever-improving performance.
- Whether you are seeking a **production-ready solution** or a **partially or fully customised system**, you can rely on our extensive experience.
- We support industry standards and **interoperability**, creating solutions that integrate seamlessly with your existing components.
- Our solutions are engineered to **withstand the rigours of agricultural environments** extreme weather, high vibration and more - and remain operational under pressure.
- **Intuitive usability and fast calibration.**
- **Compatibility** with a wide range of machinery.
- **Outstanding support**, including **Remote Access** capability.





# Navigation

Automated precision navigation systems for agricultural machinery.

Core Box

Track Controller

Auto Steering kit



## Core Box

Hexagon's Core Box is the answer to a fragmented and fast-paced industrial technology landscape, addressing issues of compatibility and system integration. Developed for agricultural **machinery manufacturers**, the Core Box enhances OEM capabilities to deliver factory-equipped units with **automatic steering** systems. It is a **modular, innovative, and agnostic** platform. The Core Box is available in two versions: Full and Lite.

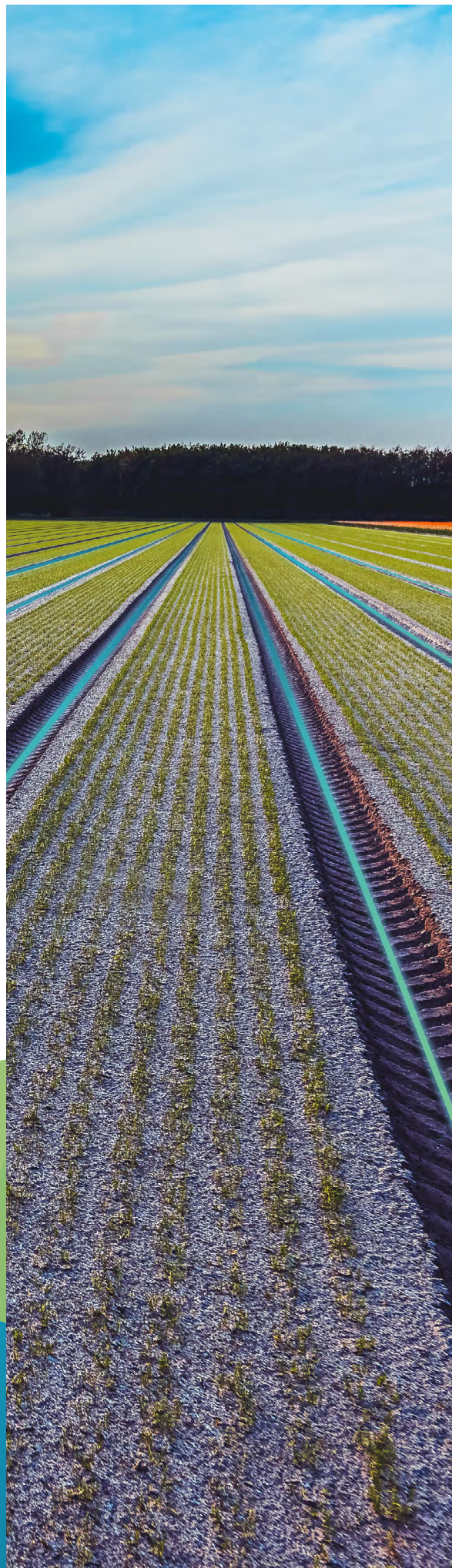
- It can be controlled via API through Ethernet, Wi-Fi, or Automotive Ethernet.
- Quick and simple integration via ISOBUS VT\* for calibration.
- Robustly designed to withstand harsh environmental conditions.
- Supported steering actuators include: Steering system, Danfoss steering valves, standard hydraulic steering valves, joystick emulator, Track Controller, and custom protocols.

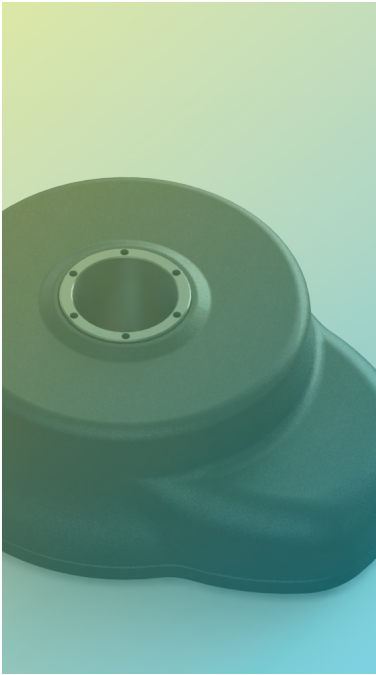
\* Please consult Hexagon for more information regarding ISOBUS VT availability.



## Explore the technical specifications of the Core Box:

Functionality	Lite	Full
IMU	✓	✓
Ethernet 100BASE-TX	✓	✓
Serial RS-232	✓	✓
4x digital inputs	✓	✓
1x digital inputs	✓	✓
High side output	✓	✓
Power supply	✓	✓
3x Interface CAN	✓	✓
Radar Emulator Output	✗	✓
Wi-Fi 2.4 GHz	✗	✓
Buzzer (internal)	✗	✓
USB C	✗	✓
Automotive Ethernet - 100BASE-T1	✗	✓
Power drive board	✗	✓
Mobile connectivity modem	✗	✓
GNSS OEM7500	✗	✗
GNSS OEM7700	✗	✗





# Track Controller

An **electromechanical steering system** that provides auto steering capabilities compatible with the majority of agricultural machine types. Its mechanical and electronic connection design allows for **quick and straightforward installation** and/or interchange, offering a user-friendly activation mechanism. The Track Controller is engineered for **agricultural machinery manufacturers** and also serves as a retrofit solution. It can be used independently or in conjunction with our auto steering ECU.

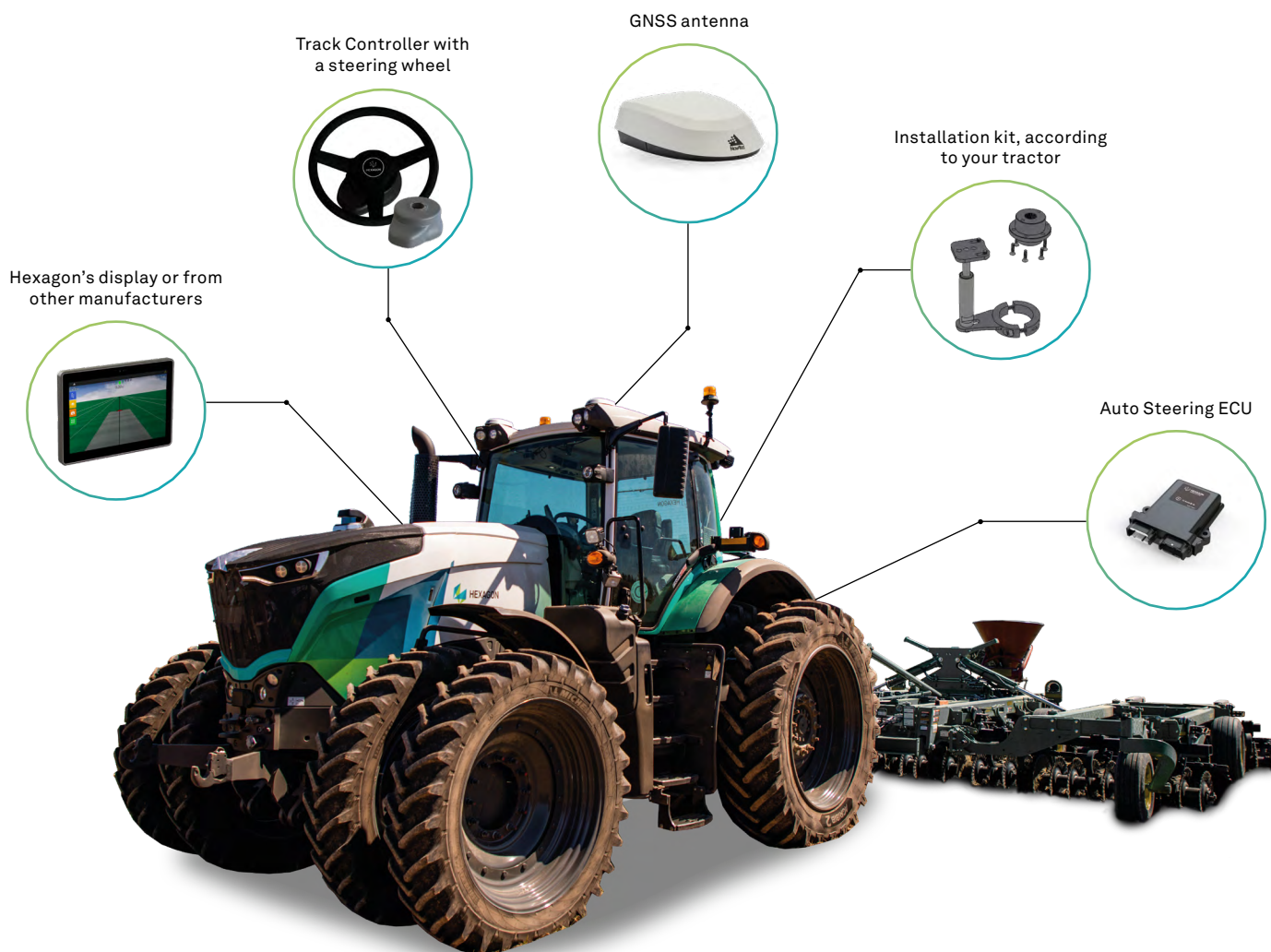
- It may be sold as a standalone module and can be easily integrated into third-party control systems.
- This product is compatible with Hexagon’s Ti5, Ti7, or Ti10 displays, as well as third-party screens.
- It enables fast installation and easy transfer between various brands and types of vehicles, with simple and rapid activation and deactivation.
- Optional GNSS antenna with inertial navigation unit for enhanced heading and terrain compensation functionality.

## Discover the technical specifications of the Track Controller:

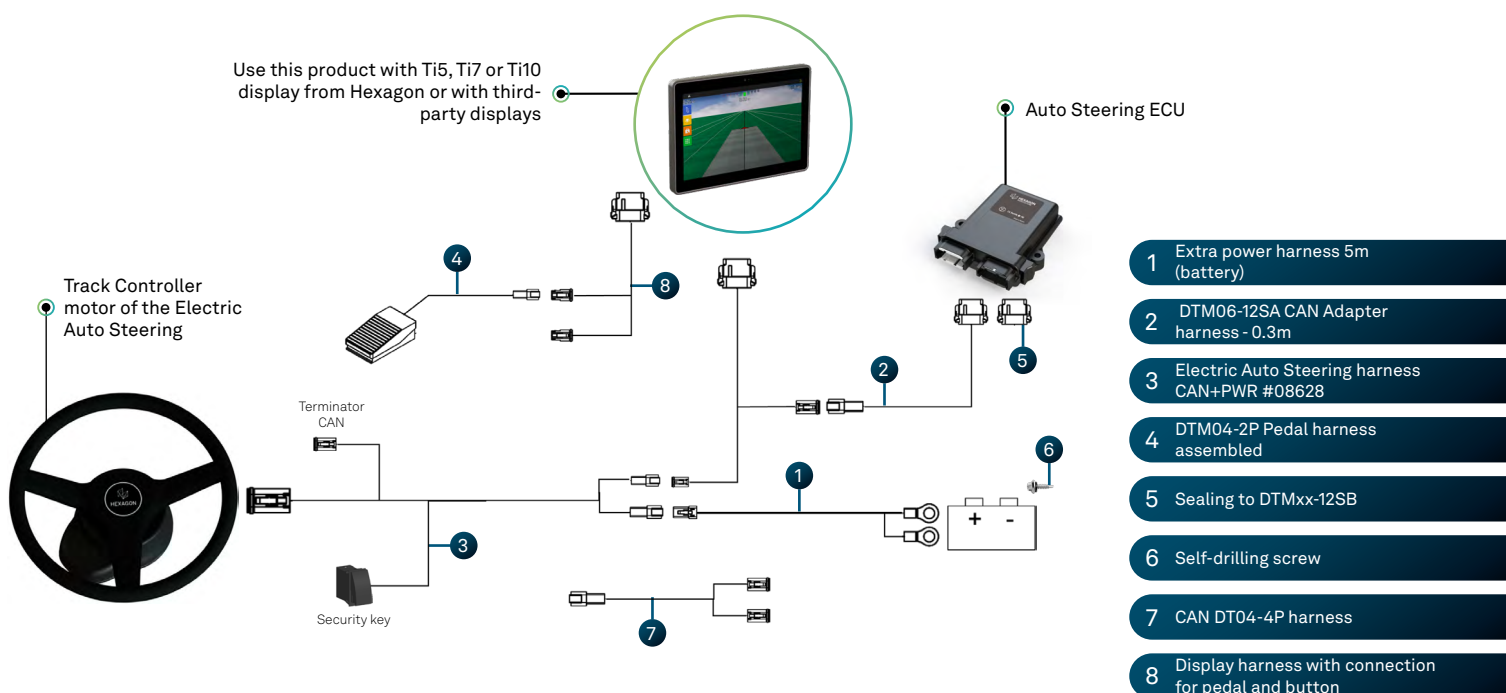
Technical Specifications	
Track Controller	Terrain compensation available with external ECU
	Brushless DC motor with integrated planetary gearbox
	Specifically designed adaptor for steering column
	Integrated “Hands on wheel” detection
	Remote Engage Switch
	Integrated power switch harness
	Power: 12V - 10A max peak
	Max Speed: 208 RPM
	Torque nominal: 3.86 Nm
	Stall Torque: 5.44 Nm
	Weight: 2.9Kg
	Operating temperature: -20°C to 85°C
	Storage temperature: -40°C to 85°C
	Compliance: CE, RCM, FCC PART 15 and E-Mark
	Vibration compliant with MIL-STD-810G, METHOD 514.6, CATEGORY 24 7.69 Grms and IEC 60068-2-6: Sinusoidal (5g, 10-200Hz)
	Mechanical shock compliant with MIL-STD-810G, method 516.6
	Procedure 1 SAWTOOTH - 40G, 1ms



## Discover the electric auto steering kit with the Track Controller:



## Track Controller components and connections:





## Auto Steering kit

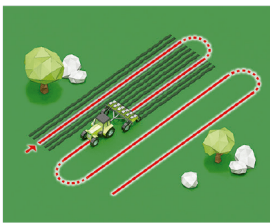
Integrated with Hexagon displays, the automated steering system ensures **seamless interaction between hardware and software**, delivering high performance and superior operational efficiency.

- This is a continuously evolving product, receiving regular updates and ever-improving performance.
- Compatible with a wide range of machinery types, including tracked tractors, steer-ready models, as well as hydraulic and electric systems.
- It utilises an Inertial Navigation System (INS) combined with satellite positioning and additional sensors to accurately determine the machine's position, orientation, inclination, and velocity.
- Terrain compensation is achieved through an integrated 6-axis Inertial Measurement Unit (IMU).
- Fully integrated with Ti5, Ti7, or Ti10 displays.

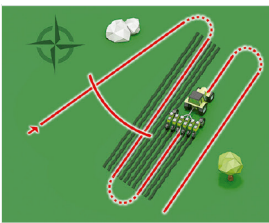
The guidance system in the Auto Steering kit provides:

- The ability to import predefined path maps or allows new trajectory maps to be created directly via the display.
- Marker placement: enables the operator to tag objects on the map, improving navigation in low-visibility conditions.

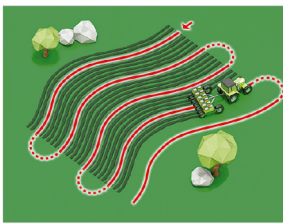
### Available trajectory patterns include:



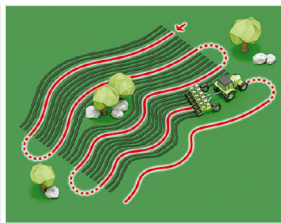
Line



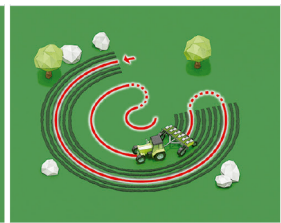
Line + Heading



Parallel Curve



Adaptative Curve



Pivot

### Compare Hexagon's Navigation Products

Features	Auto Steering kit	Core Box	Track Controller + Auto Steering ECU	Track Controller only
Control steering wheel position to a target position	✓	✓	✓	✓
Terrain compensation	✓	✓	✓	✗
Dirigir o trator com a linha de orientação como entrada	✓	✓	✗	✗
No software development required for integration	✓	✗	✗	✗





# Implement Control

Automated **implement** control systems.

ISOBUS Control kit	Planting Monitor kit
Rate Control kit	Localised Application kit
Section Control kit	Depth Monitor kit



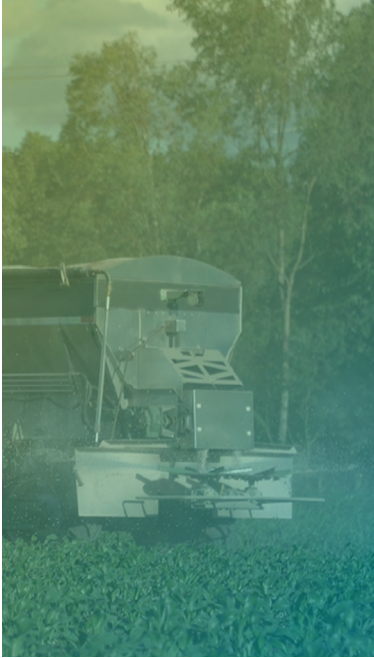
## ISOBUS Control kit

An **ECU designed for hydraulic motors or electric actuators**, interfacing with sensors and actuators via the ISOBUS protocol. Developed for the control and monitoring of **variable-rate fertiliser applications**, it features an operator-friendly interface and robust, reliable hardware.

- Engineered for harsh operating environments.
- Easily integrated with third-party displays.
- Compatible with ISOBUS displays via ISOBUS Virtual Terminal (VT) and Task Controller.
- Allows the creation of custom operational rules and dynamic configurations.
- Supports both variable rate and section control.
- The hardware and software are capable of handling a variety of field conditions.
- The user interface is intuitive and easy to operate.


### Technical Specifications - ISOBUS Control kit:

Features	ISOBUS Control kit
Performance	ARM Cortex-M7 400 MHz processor, 16 MB flash memory, 256 kB RAM, 128 kB non-volatile memory
Communications	2x CAN bus interfaces
Outputs (PWM)	3x half-bridge outputs (up to 10A per channel), 4x half-bridge outputs (up to 3A per channel) *Total output current: 14A 14 A
Inputs	4x digital inputs**, 2x analogue inputs ** 2 shared inputs with outputs
Inertial Measurement Unit	6-axis inertial sensor
Power supply	Nominal voltage: 12 VDC or 24 VDC Voltage range: 7-36 VDC
Protection Index	IP67
Operating Temperature	from -40 to +105 °C
Certifications	CE and RMC, Vibration and Shock, WEEE, RoHS



## Rate Control kit

A system for **managing input application rates**, supporting various types of actuators to enable the **regulation and automation** of variable rate applications.

- Shows real-time coverage during operation.
- Highly configurable control to ensure high performance across a broad range of implements.
- Auto tuning, fast and accurate system controller. 
- Special feature: Disc rotation control.
- Controls up to three actuators for input application.
- CAN bus communication.
- Integrated with Hexagon displays.



## Section Control kit

This system performs **automated section control** and includes pre-emptive configuration settings for opening and closing, compensating for delays in section operation.

- It is capable of controlling up to 16 electric on/off valves, 2 fertiliser gates, and up to 64 sections when used with ISOBUS Task Controller.
- The system prevents overlapping applications in the same area and avoids product use in undesired zones.
- CAN bus communication.
- Integrated with Hexagon displays



## Planting Monitor kit

With straightforward calibration, this **seed spacing monitoring system** enables the measurement of seed and billet populations, monitors planting rows, and controls input application rates.

- It supports monitoring of up to 144 planting rows.
- It includes 18 digital ports.
- Capable of controlling up to 3 input application rates.
- Operational data is logged every second for future analysis in farm management systems.
- Equipped with a built-in 6-axis Inertial Measurement Unit (IMU).
- Integrated with Hexagon displays.





## Localised Application kit

Ideal for targeted **ant bait application** in forestry operations, this system automates localised application at specific points and is compatible with two types of actuators for **simultaneous control**.

- It includes two modes of operation: (1) Systematic application with adjustable spacing and (2) Manually triggered application.
- Compatible with two different types of actuators: (1) Time-adjustable triggering and (2) Rotation-adjustable control.
- Capable of managing applications across up to three actuators simultaneously.
- Provides feedback if input is not applied successfully.
- Generates georeferenced maps of application points.
- Integrated with Hexagon displays.



## Depth Monitor kit

Designed for simple installation, this system **monitors subsoiling depth in real time** directly on the display.

- Installation is quick and uses Inertial Measurement Units (IMUs).
- The depth is displayed on the monitor screen in real time.
- Alerts can be configured to provide feedback if the depth falls outside the expected range.
- Records depth data every second, which is available for analysis in the Farm Management System.
- Integrated with Hexagon displays.

# Displays

Rugged in-field touchscreen computers with high precision, enabling the operation of machine control and precision farming solutions

| Ti5

| Ti7

| Ti10



## Ti5

5" display capable of supporting **up to three** Hexagon Machine Control products, guidance as default, electric Auto Steering kit, and one additional product of choice.

- Rugged aluminium case, ensuring reliability in all environmental conditions.
- User-friendly, with straightforward setup and calibration.
- High-contrast screen with adjustable lighting for varied visibility conditions.

## Ti7

7" display capable of **supporting all Hexagon Machine Control products**. Optional communication modules available, including Wi-Fi and/or 4G, making it ideal for high-precision operations or scenarios requiring the execution of multiple activities simultaneously.

- Rugged aluminium case, ensuring reliability in all environmental conditions.
- User-friendly, with straightforward setup and calibration.
- High-contrast screen with adjustable lighting for varied visibility conditions.
- Compatible with ISOBUS\* .

\*Please check the available model.





## Ti10

**High-performance display** with a 10" screen, enabling the use of **all Hexagon Machine Control products**. It is ideal for all types of operations and working conditions.

- With high processing capacity, it supports integrated operation with all of Hexagon's precision agriculture solutions.
- Rugged aluminium case, ensuring reliability in all environmental conditions.
- User-friendly, with straightforward setup and calibration.
- High-contrast screen with adjustable lighting for varied visibility conditions.
- Compatible with ISOBUS.

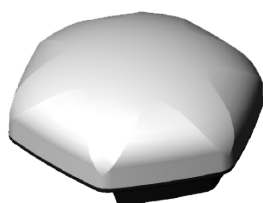


## Hexagon displays model comparison:

Features	Ti5	Ti7	Ti10
Screen configuration	5" LCD, 16M colours, 600 cd/m2 brightness and 600:1 contrast, 800x480	7" LCD, 265K colours, 1000 cd/m2 brightness and 400:1 contrast, 800x480	10" LCD, 16M colors, 1000 cd/m2 brightness, 800:1 contrast, 1280x800 (HD)
Protection index	IP65	IP65 and IP64	IP65, IP66 and IP67
Processor	Single core 800 MHz 1x ARM Cortex-A9	Single core 800 MHz 1x ARM Cortex-A9	Quad Core 1.2 GHz 4x ARM Cortex-A35
Quantity of products per equipment	Guidance, Auto Steering + one to choose	The Ti7 and Ti10 are capable of operating with high-precision positioning and can work with all Hexagon's implement control products simultaneously with the auto steering kit.	
Communication	No	Bluetooth optional 4G optional	Bluetooth 5.0 Wi-Fi 4G
ISOBUS	No	Yes*	Yes
Interfaces	USB (x1), CAN (x1) and RS-232 (x1)	USB (x1), CAN (x2) and RS-232 (x2)	USB (x2), CAN (x3) and RS-232 (x2)
Certifications	CE, RCM, RoHS, WEEE	ANATEL, CE, RED, RCM, RoHS, WEEE	ANATEL, CE, RED, RCM, RoHS, WEEE

\*Please check the available feature combinations.

## Hexagon displays come with your choice of GNSS antenna.



L1 antenna



Multi-frequency antenna



SMART7

	Basic receiver with single frequency antenna	OEM7500 with single frequency antenna	OEM7500 with multi frequency antenna	SMART7
<b>Single Point</b>	2.5 m (CEP)	1.5 m (RMS)	1.2 m (RMS)	1.2 (RMS)
<b>SBAS</b>	2.0 m (CEP)	-	60 cm (RMS)	60 cm (RMS)
<b>TerraStar-L</b>	-	-	40 cm	40 cm
<b>TerraStar-C PRO</b>	-	-	2.5 cm	2.5 cm
<b>RTK</b>	-	-	1 cm + 1 ppm	1 cm + 1 ppm









Hexagon is the global leader in precision technologies at any scale. Our digital twins, robotics and AI solutions are transforming the industries that shape our reality.

Hexagon's Autonomy & Positioning division is a global technology leader, pioneering end-to-end solutions for assured positioning for land, sea, and air. Its solutions power intelligent positioning ecosystems in vital industries and safety-of-life applications, enabling the advancement of the Autonomous X (cars, UAVs, industrial vehicles, trains, vessels, and more). The division includes leading brands NovAtel, Veripos, and AutonomouStuff

Hexagon (Nasdaq Stockholm: HEXA B) has approximately 24,500 employees in 50 countries and net sales of approximately 5.4bn EUR. Learn more at [hexagon.com](https://hexagon.com) and follow us @HexagonAB.

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